

Linac Halo Mitigation

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Baseline Plan

- LEBT aperture collimation
- High power MEBT scrapers consisting of two blades at chopper target mounted on actuators
- Three additional power supplies for alternative optics
- Beamboxes are potential location of additional low power scrapers (~ tens of Watts)

Backup Plan

- Additional high power scrapers consisting of four blades in anti-chopper box mounted on actuators

Disadvantages of DTL scraping

- Lack of flexibility to machine imperfections

There are no dipole steerers and diagnostics in the proposed aperture locations in DTL tank 1

➡ can not correct orbit at the problematic aperture.

- Severe thermal problems:

Due to energy deposit as high as hundreds of Watts, cooling of drift tubes and melting of apertures are issues.

- Asymmetric scraping is an issue due to machine imperfections.

- Too small aperture is required ~ 6mm radius.

Conclusion

- **Modification of 2nd half MEBT optics greatly reduces tail.**
 1. Optics up to chopper target is unchanged.
 2. Three more power supplies are necessary.
 3. Phase advance between CT and AC is reduced to 63° .
 4. $s_y=1.94\text{mm}$ rather than 1.58mm .
- **Modification of entire MEBT optics reduces tail further significantly.**
 1. Y deflection at chopper target is 90% of baseline MEBT optics.
 2. $s_y=2.12\text{mm}$ rather than 1.58mm .
- **Collimation at chopper target and/or anti-chopper box eliminates tail further.**
- **MEBT collimation and/or MEBT optics change does a better job than DTL collimation.**
- **DTL collimation seems unnecessary.**